

# DISTRIBUTIONAL ECOLOGY OF THE VELVET SWIMMING CRAB, *NECORA PUBER* (DECAPODA, BRACHYURA, PORTUNIDAE)

Around the Gower Peninsula (South Wales, UK), *Necora puber* is found mainly on rocky or stony substrata extending from the lower mid-shore down to a depth of about 20 metres below chart datum (Choy, 1988). Routine monthly samples of *N. puber* were taken between October, 1983 and September, 1985 at Langland Bay (51°32'53"N, 4°1'18"W) and between November, 1983 and April 1985 at Worms Head Sound, Rhossili (51°33'42"N, 4°18'16"W), both on the Gower Peninsula. In the intertidal zone, crabs were caught by hand while searching (for 15 minutes at each station of stratified design, and corresponding to different tidal heights) under boulders and rocks during different phases of the tidal and diurnal cycles. Sublittoral samples (to a depth of 20m) were obtained by SCUBA or snorkelling.

## Results and Discussion

Catch rate was positively correlated to water temperature ( $P < 0.05$ ). The increase in the catch rate of crabs in the intertidal zone between March and November was a result of more newly settled juveniles ( $< 10$ mm CW) and migrant adults ( $> 40$ mm CW). Adult crabs did not remain in the littoral zone permanently (Choy, 1988). Crabs migrated onshore either to feed or moult during these warmer months (Crothers, 1968); many adults were in mating pairs. Adult females were ovigerous mainly between January and March, but not between September and November (Choy, 1988).

During winter most of the crabs (especially the adults) were found in the sublittoral zone where the temperature and salinity were more stable. However, complete emigration to the sublittoral zone did not take place as some large crabs were still found on the shore even during the cold months, particularly during low tides which occurred in the mornings. Such a pattern has also been reported for *C. maenas* (Naylor, 1962; Crothers, 1968).

Higher catches were obtained at Rhossili than at Langland Bay ( $P < 0.01$ ). There was also a marked difference in the size composition of crabs from the two localities; crabs from Langland Bay being larger ( $P < 0.01$ ). At Rhossili, newly settled juveniles appeared in mid-June and continued to do so until the end of July; there were also some in September. During July, August and September, densities of up to 30 juveniles  $m^{-2}$  were recorded. There was a progression of the 2.5mm modal width from June until January when the crabs reached about 27mm CW. At Langland Bay, newly settled juveniles (the early crab instars) were never observed although the later instars (7–15mm CW) were. Perhaps larval

settlement does not take place here as a result of siltiness, the strength of tidal streams, unsuitable substratum or some other unidentified factor. However, if settlement does occur, it is likely that the numbers are very low and the crabs escape detection or they are immediately predated on.

Boulders at Rhossili were smaller than those at Langland Bay ( $P < 0.05$ ) and the size of crabs found under the boulders was correlated to boulder size ( $P < 0.05$ ). However, the shape of the boulders was also important: flat boulders sheltered more crabs, especially when these boulders overlaid smaller ones. This partially explains the difference in the size composition of crabs found at Langland and at Rhossili. *N. puber* was never found under otherwise suitable shelters which had decaying organic material or anoxic substrate under them.

During summer, smaller crabs were more abundant in the *Fucus* zone (mid-littoral, LWN–ELWN); the large ones found here were mainly males that were moulting or were about to moult. Very few crabs were found in this zone during winter. Ovigerous females and copulating pairs were found only in the *Laminaria* zone (lower littoral, LWS–ELWS). During winter, the size composition of crabs in the intertidal zone differed depending on the time of day of sampling and the tidal phase. Larger crabs (mainly males) were caught during low tides that occurred during the morning. During the summer large crabs were caught at all low tides irrespective of when these tides occurred.

During the warmer months, increased exploitation of crabs for bait and associated disturbances of the boulders resulted in lower abundance of crabs in the intertidal zone. It was estimated that three to four tidal cycles were required for replenishment of exploited stocks in this zone.

## Literature Cited

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